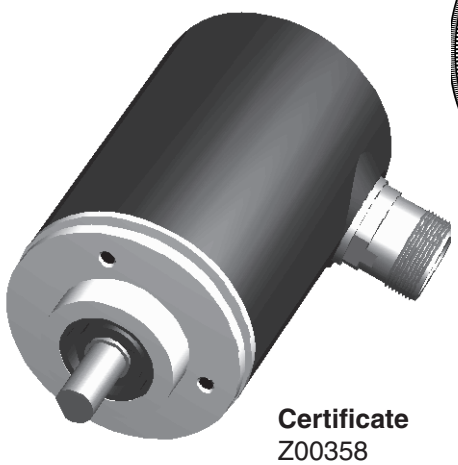
Electro-Optical Absolute Encoders
Models CRD 58 - CRD 65 - CRD 66 - CRD 105
MULTITURN ☐ Interface PROFIBUS-DP

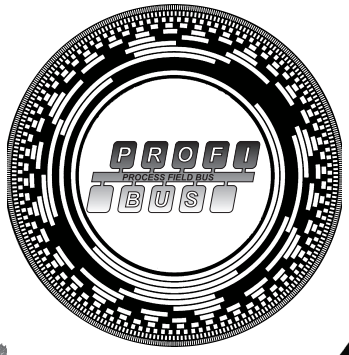
CRD 10534 HE

06 / 2013

- **Compact and robust design for mechanical engineering and industrial plant applications**
- **With PROFIBUS-DP interface (*process field bus - decentral periphery*)**
- **DP-slave class 2 functionality in according to *Profibus-Profile for Encoders, No. 3.062***
- **Transmission speed: 12 MBaud max.**
- **Output code: natural binary**
- **Resolution: max. 8192 positions per revolution (13 Bits)**
- **Measuring range: max. 4096 revolutions**
- **Total number of positions: 2^{25} (25 Bits)**
- **Variant "L" with RS 25 round connector**
- **Variant "Z" with connecting cap: T-coupler functionality with integrated addressing facility as well as bus-termination resistors**
- **Diagnosis LED's for Supply voltage, SRD, Class and Error**
- **Protection grade IP 65 or IP 66**
- **Option: flange, housing and connecting cap in stainless steel (model series SRD)**



Certificate
Z00358



Certificate
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Construction

Flange and housing of aluminium (model series SRD: stainless steel) - shaft of stainless steel - 12 mm ball-bearings with Nilos ring seal or radial packing ring seal - code disk of glass or of deformation resistant plastic - GaAlAs diodes - photo-transistor array with comparator and trigger circuits for long-term stabilization of the sensor systems gate array - SMD technology.

General features and modes of connection

The CRD encoders are designed for connecting directly to PROFIBUS-DP buses as slave stations. The interface is realized with the SPC3 Siemens PROFIBUS controller. The encoders can be operated with transmission speeds of up to 12 MBaud. The protocol is executed in accordance with *DP-slave class 2* functionality as laid down in *Profibus-Profile for Encoders, No. 3.062* and is described in detail in the user manual TZY 10617.

Two different modes of electrical connection are provided as standard variants (Line driver in acc. with RS 485):

Variant Z with connecting cap (standard)

(T-coupler functionality with integrated addressing)

This variant is designed for the following connection cables and provides the following functions:

- ☐ 1 cable for the supply voltage
  (+ V_S = 24 VDC, - V_S = 0 VDC), PG 7 cable gland
- ☐ 1 cable for Bus In (A, B), PG 9 cable gland
- ☐ 1 cable for Bus Out (A', B'), PG 9 cable gland
- ☐ The station address and bus-termination resistors are set with DIP switches in the connecting cap.

Variant L with RS 25 round connector:

- ☐ The encoder is connected to the bus with a cable (connector arrangement in accordance with profile description for encoders).
- ☐ The default address is changed via the service for changing the station address of a DP slave, namely DDLM_Set_Slave_Add. The bus-termination resistors have to be installed externally.

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Electrical data

- Sensor system: GaAlAs diodes, photo-transistor array
- Resolution: 8192 positions revolution, max.
- Measuring range: 4096 revolutions
- Total number of positions: 2^{25} (25 Bits)
- Graduation code: Gray
- Max. position variance: ≤ 2' 38" at 4096 positions/rev. ≤ ±1'59 at 8192 positions/rev.
- Output code: Natural binary or Gray
- Code sense: CW or CCW; (programmable)
- Supply voltage range: + 13,5 VDC to + 30 VDC
- Power consumption: PD ≤ 3,5 W (Inrush current ≤ 300 mA)
- Interface: Line driver in acc. with RS 485; galvanic separation is achieved with an opto-coupler. Supply voltage galvanic separation is achieved with DC/DC-converter
- Electromagnetic compatibility (EMC): EN 61000-4-2 (ESD), EN 61000-4-4 (Burst), EN 61000-6-4 (Emission)

Mechanical data

- Operating speed: 3000 rpm max. (continuous) 4000 rpm max. (short period)
- Angular acceleration: 10^5 rad/s² max.
- Moment of inertia (rotor): 45 gcm²
- Operating torque: ≤ 5 Ncm (8 Ncm - CRD 66) (at 1000 rpm)
- Starting torque: ≤ 1 Ncm (4 Ncm - CRD 66)
- Permissible shaft load: 250 N max. (axial and radial)
- Bearing life expectancy: 10^9 revolutions *
- Mass: ca. 0.5 kg with round connector ca. 0.7 kg with connecting cap

* At max. shaft load and working temperature between - 20 °C and + 60 °C. Higher values are permissible with lower loads.

Bus data

- Specification: PROFIBUS-DP, Slave stations SPC3 Siemens PROFIBUS controller
- Data transmission rate: 9.6 kBaud to 12 MBaud
- Manufacturer code: 1962H
- Station address: 1 to 126, default value: 123; with variant Z the station address is set with DIP switches; with variant L the station address can be changed with the DDLM_Set_Slave_Add service
- GSD File: in acc. with DIN 19245-3, PROFIBUS-DP
- Diagnosis LEDs*: UB_S (green) - V_S Supply voltage
  SRD (green) - SRD
  C (green) - Class
  Err (red) - Error
- Freeze mode: being supported
- Sync. mode: being supported
- Automatic baud rate search: being supported
- Diagnosis bytes
  Class 2: 63 Diagnosis bytes
  Class 1: 16 Diagnosis bytes
- User-Parameter bytes:
  Class 2: 22 bytes
  Class 1: 2 bytes
- Configuration options:
  D0 (1 Word Input, consistent) - Class1
  D1 (2 Word Input, consistent) - Class1
  F0 (1 Word Input / Output, consistent) - Class2
  F1 (2 Word Input / Output, consistent) - Class2

* True table according connector arrangement supplied with each item.

Parameters which can be programmed (via DDLM_Set_Prm / DDLM_Data_Exchange / DDLM_Set_Slave_Add)

	Value range	Description of parameter
Code sense	CW, CCW	Direction of rotation when looking towards the shaft: CW (clockwise), CCW (counter clockwise)
Class 2 functionality	enable / disable	Enable for class 2 functionality
Diagnosis routine	yes / no	Diagnosis routine for the encoder
Scaling function	enable / disable	Enable for programming the parameters Resolution and Total number of positions
Resolution: positions per revolution	1 to 8192 positions per revolution	Resolution (number of positions per revolution)
Total number of positions	1 to 33.554.432	Total number of positions
"Reference value (DDLM-Data_Exchange)"	0 to (Total number of positions -1)	Value displayed at the reference point
Station address	1 to 126	Identification of the station within the bus network (can only be programmed with variant L via RS 25 connector)

Environmental data

- Operating temperature range: - 20 °C to + 60 °C
  ☐ optional - 40 °C to + 85 °C
- Storage temperature range: - 20 °C to + 70 °C
  ☐ optional - 40 °C to + 95 °C
- Permissible rel. humidity: 85 % without condensation
- Resistance to shock: 200 m/s²; 11 ms (DIN IEC 68)
- Resistance to vibration: 5 Hz to 1000 Hz; 100 m/s² (DIN IEC 68)
- Protection grade (DIN 40 050)
  CRD 58 and 65: IP 65 (Nilos ring)
  CRD 66: IP 66 (radial packing ring)
  CRD 105: IP65
- Connecting cap: IP 00 (when not mounted)

Electrical connections (alternatives)

- Connecting cap: (variant Z) T-coupler with 3 PG cable glands; integrated addressing facility and bus-termination resistors
- Round connector RS 25: (variant L) 12 pin

Order code format for encoder

CRD 58 - 4096 R 4096 C2 Z 01

- 01 – Electrical and/or mechanical variants *
- Z – Electrical connection Z = via connecting cap L = with RS 25 round connector
- C2 – C2 = Device Class 2 (Profile No. 3062)
- 4096 – Max. number of revolutions able to be acquired
- R – Output code R = natural binary G = gray
- 4096 – Model No. 58, 65, 66 or 105
- 58 – Positions per revolution
- CRD – Model series CRD - absolute encoder with PROFIBUS-DP interface

* The basic versions in accordance with the data sheet bear the code number 01. Variations from the basic version are indicated with a consecutive number and are documented in our works.

Order code format for connecting cap

Z D - P 3 L 4 - 01

- 01 – Electrical and/or mechanical variants *
- L4 – Number of LEDs
- 3 – Number of PG unions
- P – P = PG union
- D – Connecting cap for model CRD
- Z – Connecting cap for variant “Z” encoder

* The basic versions in accordance with the data sheet bear the code number 01. Variations from the basic version are indicated with a consecutive number and are documented in our works.

Order code for the stainless steel version:

e.g. SRD 66 - 8192 R 4096 C2 Z01

ZD - P3L0 - 11

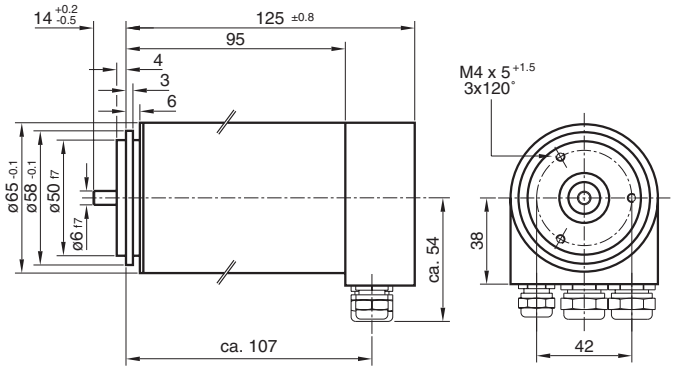
Notes:

- Mounting accessories and securing clips can be supplied; see data sheet MZ 10111.
- The model No. 105 encoders have a 105 mm ø housing and can be supplied on request with a mounting bracket and heating.
- Copies of *Profibus-Profile for Encoders, No. 3.062* can be obtained from: PROFIBUS Nutzerorganisation e.V., Haid und Neu Str. 7, D-76131 Karlsruhe.
- The TWK user manual TZY 10617 as well as the GSD file and example programmes for the integration of the encoder in a Profibus network with Siemens S7 controlers are available for download on www.twk.de or can be order on CD.

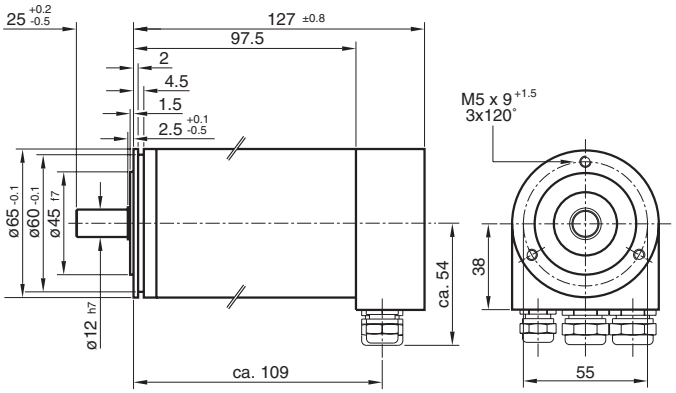
Dimensions in mm

Variant „Z“ with connecting cap ZD

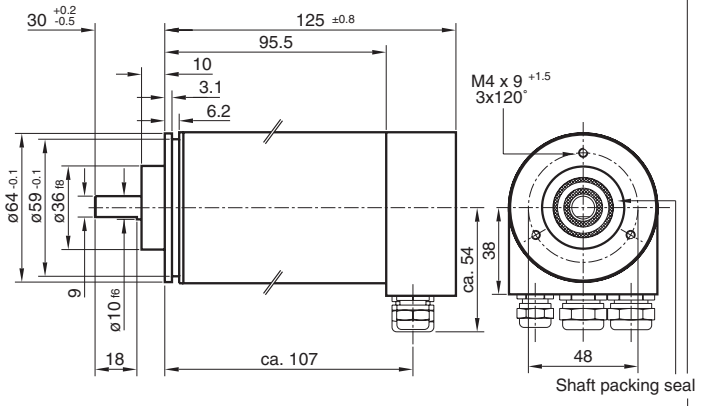
Model No. 58 with synchro-flange



Model No. 65 with synchro-flange

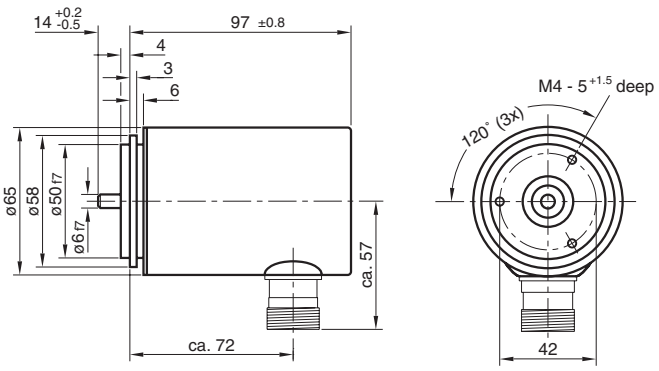


Model No. 66 with clamping flange and shaft with flat

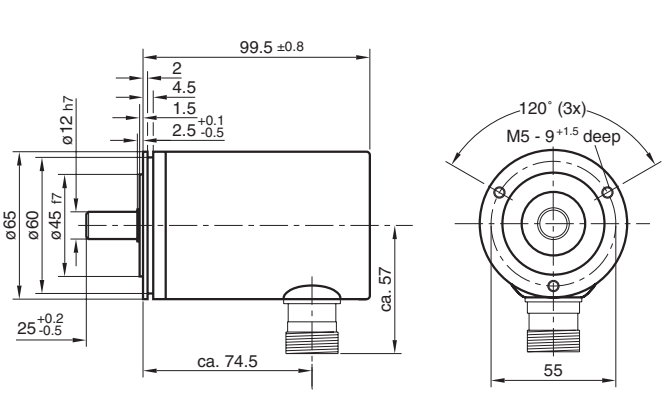


Variant „L“ with RS connector (12 pin)

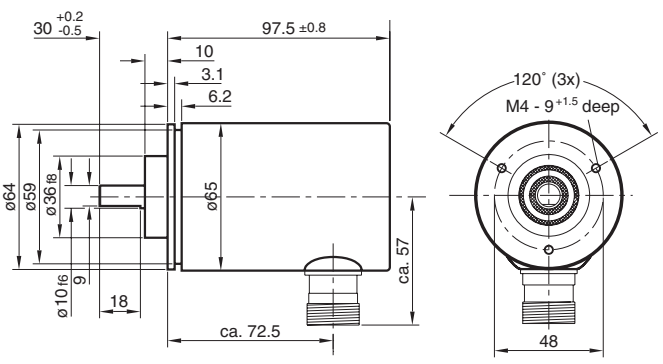
Model No. 58 with synchro-flange



Model No. 65 with synchro-flange

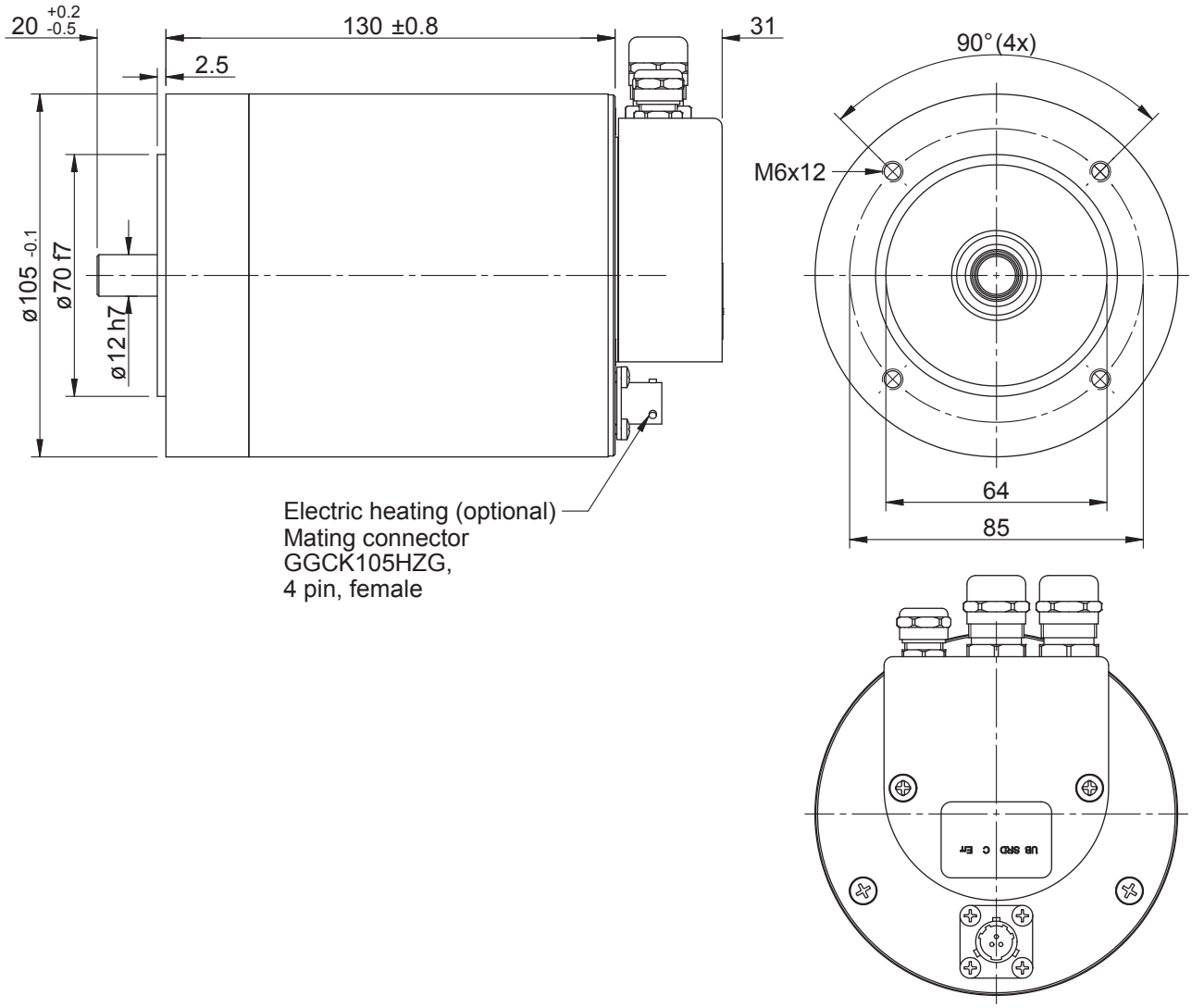


Model No. 66 with clamping flange and shaft with flat



The mating plugs STR 12 G P07 do not form part of the scope of delivery

Design form 105 with heating (option)



Connecting cap ZD-P3L4-01

The cap is listed as a separate item for ordering and delivery. The cap can be separated from the encoder for setting purposes by removing two screws.